1.4 Create and Work with Vectors and Matrices in R

```
x <- 11
x
[1] 11

# create vector
> x1 <- c(1,3,5,7,9)
> x1
[1]1 3 5 7 9

# vector of character
gender <- c("male", "female")

> 2:7
[1] 2 3 4 5 6 7

seq(from=1, to=7, by=1)
[1] 1 2 3 4 5 6 7
seq(from=1, to=7, by=1/3)
[1] 1.000000 1.33333 1.666667 2.00000 ...
[9] 3.666667 4.00000 ....
[17] 6.33333 6.666667 ...
seq(from=1, to=7, by=0.25)
[1] 1.00 1.25 1.50 ....

# repeat
rep(1, times=10)
[1] 1 1 1 1 1 1 1 1 1 1
rep("yes", times=5)
[1] "yes" "yes" "yes" "yes" "yes"
rep(1:3, times=5)
[1] 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3
rep(seq(from=2, to=5, by=0.25), times=5)
rep(c("m", "f"), times=3)
[1] "m" "f" "m" "f" "m" "f"
```

```r
# set x, y vectors
x <- 1:5
[1] 1 2 3 4 5
y <- c(1,3,5,7,9)
[1] 1 3 5 7 9
x + 10
x - 10
x*10
x/2

# if two vectors of the same length, we may add/subtract/mult/div
# corresponding elements
x + y

# extract specific elements 選取特定
y[3]
[1] 5
y[-3]
[1] 1 3 7 9
y[1:3]
[1] 1 3 5
y[c(1, 5)]
[1] 1 9
y[-c(1,5)]
[1] 3 5 7
y[y<6]
[1] 1 3 5

# matrix 矩陣
mat <- matrix(c(1,2,3,4,5,6,7,8,9), nrow=3, byrow=TRUE)
     [,1] [,2] [,3]
[1,]    1    2    3
[2,]    4    5    6
[3,]    7    8    9
matrix(c(1,2,3,4,5,6,7,8,9), nrow=3, byrow=FALSE)
     [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
[3,]    3    6    9
```

```
# [列, 欄]
mat[1, 2]
[1] 2
mat[c(1, 3), 2]
[1] 2 8
mat[2,]
[1] 4 5 6
mat*10

# nrow橫列，ncol直行，FALSE照行來排
matrixOne <- matrix(1:100, nrow=10, ncol=10, byrow=FALSE)
      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]
 [1,]    1   11   21   31   41   51   61   71   81    91
 [2,]    2   12   22   32   42   52   62   72   82    92
 [3,]    3   13   23   33   43   53   63   73   83    93
 [4,]    4   14   24   34   44   54   64   74   84    94
 [5,]    5   15   25   35   45   55   65   75   85    95
 [6,]    6   16   26   36   46   56   66   76   86    96
 [7,]    7   17   27   37   47   57   67   77   87    97
 [8,]    8   18   28   38   48   58   68   78   88    98
 [9,]    9   19   29   39   49   59   69   79   89    99
[10,]   10   20   30   40   50   60   70   80   90   100
# Submatrix 子矩陣
matrixSub <- matrixOne[7:8,3:5]
     [,1] [,2] [,3]
[1,]   27   37   47
[2,]   28   38   48

matrixMinus[2,3] <- "try" # 字串取代數字
# 整個matrix變為字串
```

💡 放進2列6行的矩陣

```
> qq <- rep(seq(2,8,2), 3)
> qq
 [1] 2 4 6 8 2 4 6 8 2 4 6 8
> mat <- matrix(qq, nrow=2, ncol=6, byrow=TRUE)
> mat
     [,1] [,2] [,3] [,4] [,5] [,6]
[1,]    2    4    6    8    2    4
[2,]    6    8    2    4    6    8
```

```
> bb <- matrix(1:12, nrow=6)
> bb
     [,1] [,2]
[1,]    1    7
[2,]    2    8
[3,]    3    9
[4,]    4   10
[5,]    5   11
[6,]    6   12
> class(bb)
[1] "matrix" "array"

# 資料型態
> bb <- as.data.frame(bb)
> bb
  V1 V2
1  1  7
2  2  8
3  3  9
4  4 10
```

1.5 Import Data, Copy Data from Excel to R CSV & TXT Files

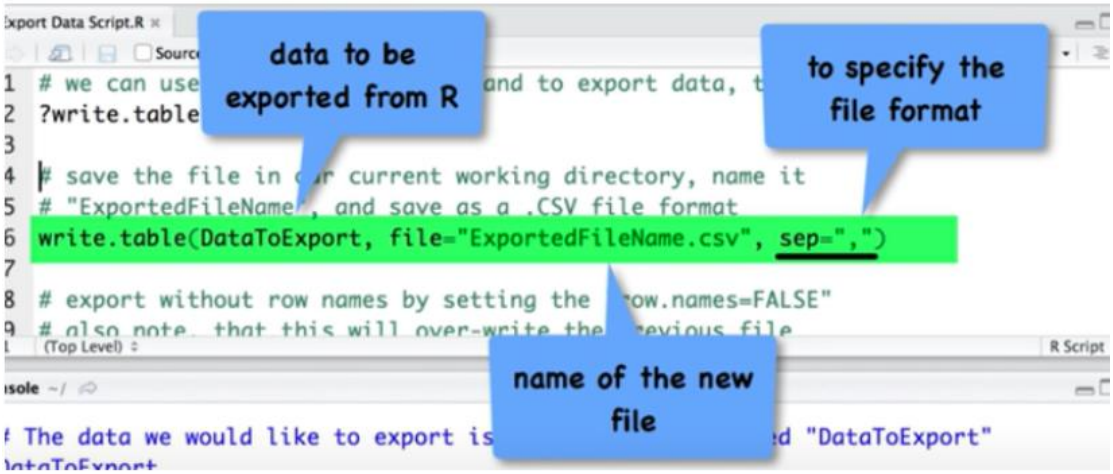
```
# save the file as .csv/.txt
# import file
data1 <- read.csv(file.choose(), header=TRUE)
data2 <- read.table(file.choose(), header=T, sep=",")

data3 <- read.delim(file.choose(), header=T)
data4 <- read.table(file.choose(), header=T, sep="\t")
```

1.6 Export Data from R (csv , txt and other formats)

The most flexible command for exporting data from R is **write.table**

```
?write.table
# save the file in our current working directory, name it
# "ExportedFileName", and save as .CSV file format
write.table(DataToExport, file="ExportedFileName.csv", sep=",")
```



To get rid of the row names while exporting data from R to Excel: **row.names=FALSE**

```
write.table(DataToExport, file="ExportedFileName.csv", row.names=F, s

# export into a different working directory
# specify the path for where to save the file instead 指定特定路徑
write.table(DataToExport, file="/Users/..../ExportedFileName.csv", ro
```

1.7 Importing , Checking and Working with Data in R

R Copy Caption

```
# how to input data
> help(read.table)
> ?read.table

> Data1 <- read.table(file="檔案路徑", header=TRUE, sep="\t")
> Data2 <- read.table(file.choose(), header=TRUE, sep="\t")

# remove data
> rm(Data1)
> rm(Data2)

# know the dimensions of the data
> dim(Data1)
[1] 725 6

# first 6 rows
> head(Data1)
# last 6 rows
> tail(Data1)

# 顯示特定幾列
> Data1[c(5,6,7,8,9), ]
> Data1[5:9, ]

# 顯示特定幾列除外
> Data1[-(4:722), ]
# 顯示1, 2, 3, 723, 724, 725

# show the names
> names(Data1)
[1] "LungCap" "Age" "Height" ...
```